TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT BUILDING AND CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BSC IN CIVIL ENGINEERING

ECE 2312: HYDRAULICS II

END OF SEMESTER EXAMINATION

SERIES:APRIL2016

TIME:2HOURS

DATE:11May2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, Drawing Instruments, Scientific calculator, examination pass and student ID

This paper consists of five questions. Attemptquestion ONE (Compulsory) and any other TWO questions.

Qs.1.(a) Define the following terms:

(i) Cavitation **(4marks)**

(ii) Hydraulic efficiency **(2marks)**

(iii) Mechanical efficiency **(2marks)**

(b) Describe the two types of turbines commonly in use. **(2marks)**

(c) Outline three assumptions made in developing the linear wave theory **(8 marks)**

(d) A pelton wheel is supplied water under a head of 200m through a 100mm diameter pipe. If the quantity of water supplied to the wheel is 1.25m^3/s. Calculate the number of jets.
Assume C_v =0.97 **(12 marks)**

Qs.2 A Pelton wheel is to be designed for the following specifications:

Power (brake or shaft): 9560kW

Head: 350metres

Speed: 750r.p.m
Overall efficiency: 85%
Jet diameter not to exceed 1/6 of the wheel diameter
Calculate the following:

(i) The wheel diameter **(8marks)**
(ii) Diameter of the jet, and **(8marks)**
(iii) The number of jets required.
Take Cv=0.985, speed ratio=0.45 **(4marks)**

Qs.3 (a) Describe how the minimum value of a cavitation parameter can be determined experimentally for a given machine or model turbine **(6 marks)**

(b) Define the overall efficiency e of a reaction turbine and explain the terms **(6 marks)**

(c) Derive the formula for the greatest hydraulic efficiency for a given turbine **(8 marks)**

Qs.4 (a) Describe "managed retreat" in generic strategies for coastal defense or general coastal management strategies **(8 marks)**

(b) Enumerate two examples of event warning systems in coastal management and how they are they used for. **(3 marks)**

(c) A pelton wheel develops 1750kW under a head of 100m while running at 200r.p.m and discharging 2500litres of water per second. Calculate

i. The unit power **(3 marks)**
ii. The unit speed **(3 marks)**
iii. Unit discharges of the wheel **(3 marks)**

Qs.5 (a) Outline three factors that influence the formation of wind waves **(3 marks)**

(b) What are waves characterized by **(4 marks)**

(c) Describe the current challenges in coastal management **(13 marks)**